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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,698	08/21/2006	James Phillips	BJS-620-393	5891

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EXAMINER	
SRIVASTAVA, KAILASH C	
ART UNIT	PAPER NUMBER
1657	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/551,698	PHILLIPS ET AL.	
	Examiner	Art Unit	
	Kailash C. Srivastava	1657	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *09/30/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Preliminary Amendment filed 30 September 2005 is acknowledged and entered.

Claims 4-22, 26-30 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from another multiply dependent claim.

Claims Status

2. In view of the Preliminary Amendment filed 30 September 2005, following is the current status of the Claims:

- Claims 3-5, 7, 10-16, 21-22 and 25-29 have been amended
- Claims 1-30 are pending and are examined on merits.

Informal Matters

3. The instant application (i.e., 10/551,698) under prosecution at the United States Patent and Trademark Office (i.e., USPTO) has been assigned to Examiner Kailash C. Srivastava in Art Unit 1657. To aid in correlating any papers for this application (i.e., 10/551,698) all further correspondence regarding the instant application (i.e., 10/551,698) should be directed to Examiner Kailash C. Srivastava in Art Unit 1657.

4. Examiner regrets any inconvenience because of the delay in issuing the instant Office Action that follows.

Priority

5. Claim for foreign priority under 35 U.S.C. §371 to PCT/GB04/01455 filed 02 April 2005 is acknowledged.

Information Disclosure Statement

6. The Information Disclosure Statement (i.e., IDS) filed 30 September 2005 is acknowledged, has been made of record, considered and duly initialed sheets of the appropriate USPTO form are enclosed with the instant Office Action.

Specification Objection

7. Please update the Application Priority data at Page 1, Paragraph 1, Line 1 of the Specification. Said information is currently missing from the specification.

Claims Objected – Minor Informalities

8. Claims 2-6, 8, 10-22, 24, 26-28 and 30 objected because of the following informalities:

- Each of Claims 2-3 objected because of the phrase, "said the" at Line one of each one of the cited Claims.
- Claims 5-6 are objected because at Line two of each one of the cited Claims, the sentence does not end with a period.
- Claim 15 objected because it potentially lacks antecedent basis. Said Claim depends from Claim 12, Claim 12, in by itself does not have the limitation, sheath" as described at Claim 15, Line 2. Appropriate correction is requested.
- Claims 22 objected because at line 2 of said claim the phrase. "in vitro" should be italicized according to art-recognized phraseology as "*in vitro*".

In response to instant Office Action Appropriate correction to each of the objections pointed supra is required.

Oath Objected

9. The oath or declaration is defective. A new oath or declaration in compliance with 37 C.F.R. §1.67(a) identifying this application by application number and filing date is required. See M.P.E.P . §602.01 and §602.02.

- The oath or declaration is defective because:

  Non-initialed alterations have been made to the oath or declaration for first Applicant's current address. See 37 C.F.R. §1.52(c).

In response to instant Office Action Appropriate correction to each of the objections pointed *supra* is required.

Claim Rejections - 35 U.S.C. § 112

35 U.S.C. §112, Second Paragraph

10. The following is a quotation of the second paragraph of 35 U.S.C. § 112:

> ***The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.***

11. Claim 29 is rejected under 35 U.S.C. §112 second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- The limitation, "repairing tissue damage" in Claim 29 lacks sufficient antecedent basis because said Claim depends from Claim 1. It is improper for a method claim to depend from an apparatus claim.

Claim Rejections – 35 U.S.C. §102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. §102 that form the basis for the rejections under this section made in this Office action:

> ***A person shall be entitled to a patent unless –***
>
> ***(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.***

13. Claims 1-8, 10-12 and 14 are rejected under 35 U.S.C. §102(b) as anticipated by Shakesheff et al., (WO 02/47557 A1, See Applicants' IDS filed 09/20/2005).

Claims 1-8, 10-12 and 14 recite a tissue growth guide composition and application thereof for repairing damaged tissue, wherein said composition comprises:

- an inner core comprising a biopolymer matrix having one or more cells;
- an outer sheath surrounding said inner core;
- said inner core is fixed to said outer sheath so that said cells produce a mechanical tension in said;
- said mechanical tension of said cells causes alignment of said cells and of said biopolymer matrix fibers;
- said biopolymer matrix is collagen;
- said sheath comprises one or more entry ports for the entry of regenerating tissue, said tissue is nerve;
- said sheath comprises an entry port and an exit port for the entry/exit of regenerating nerve;
- mechanical tension in the core imparts traction on regenerating tissue;

- said composition is comprised of one or more cells from the Markush group as described in the instantly presented Claim 11, wherein said cells are fibroblasts and Schwann cells; and

- said sheath is non-porous.

Claims 1-8, 10-12 and 14 Shakesheff et al., teach microconduits (Figure 1) having a diameter smaller than the diameter of the nerve to be regenerated, direct nerve regeneration and neurirte extension. Said conduit has an opening at proximal and at distal end to receive the neurite, an inner lumen to regenerate the neurite (Page 2, Lines 3-11). Said conduit's wall is made of glass and is impermeable to biomacromolecules, cells and gases and the lumen is filled with a hydrogel material, e.g., collagen (Page 3, Lines 6-17). Since nurites present in the gel filled lumen of said conduits are deprived of any nutrients with in the conduit because of the impermeability, a mechanical tension is imparted to the nurites thus allowing said nurites to grow along the conduit toward said conduit's distal end, especially the growth factors being disposed at the distal end or near the distal end (Page 3, Lines 20-28). Said conduits are applicable as nerve guides in regenerating damaged nerves (Page 4, lines 3-4 and 18-23). Please note, neuritis are undifferentiated axon or dendrites within a cell culture and are therefore neuroblasts. Thus, Shakesheff et al., teach a tissue growth guide implant for regeneration of a damaged nerve.

Therefore, Shakesheff et al., anticipate the cited claims.

Claim Rejections - 35 U.S.C. § 103

14. The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> ***(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.***

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. § *103*(c) and potential 35 U.S.C. § *102*(f) or (g) prior art under 35 U.S.C. § 103(a).

16. Claims 1-21 and 23-25 are rejected under 35 U.S.C. §103 (a) as obvious over the combined teachings from Kadiyala et al., (US Patent 6, 174,333 B1, See Applicants' IDS filed 09/20/2005) in view of each of Shakesheff et al., (WO 02/47557 A1, See Applicants' IDS filed 09/20/2005) and Chen et al (2000. Peripheral nerve regeneration using silicone rubber chambers filled with collagen, laminin and fibronectin. Biomaterials, Volume 21, pages1541-1547, Applicants' IDS filed 09/30/2005).

Claims 1-21 and 23-25 recite composition and a method of making said composition, wherein said composition comprises:

- an inner core comprising a biopolymer matrix having one or more cells;
- an outer sheath surrounding said inner core;
- said inner core is fixed to said outer sheath at a first and a second attachment region so that said cells produce a mechanical tension in said core between said attachment regions;

- said mechanical tension of said cells causes alignment of said cells and of said biopolymer matrix fibers;

- said biopolymer matrix is collagen;

- said sheath comprises one or more entry ports for the entry of regenerating tissue, said tissue is nerve;

- said sheath comprises an entry port and an exit port for the entry/exit of regenerating nerve;
- said guide comprising one or more fixings for fixing in place the entry point adjacent to the proximal end of a damaged nerve and the exit point at the distal end of a damaged nerve;

- mechanical tension in the core imparts traction on regenerating tissue;

- said composition is comprised of one or more cells from the Markush group as described in the instantly presented Claim 11, wherein said cells are fibroblasts and Schwann cells;

- said sheath is non-porous, is comprised of one of biosorbable material selected from the Markush Group describe in Claim 15; and

- said sheath is mechanically fixed to the core and cooperatively engages the core at the first and second attachment points to prevent coaxial movement of said core.

Regarding Claims 1-21 Kadiyala et al., teach a composition comprised of a suture material, a gel material containing reparative cells contracted around another suture having attachable ends (Column 4, Lines28-35; Figures 1-2. Said two sutures are contained in a slitted glass mold, wherein the cells within the matrix at suture two are aligned in the direction of tension applied to the matrix because of the tension wire, wherein said tension wire also aligns said matrix (Column 4, Lines 36-49). Said gel matrix is collagen (Column 4, Lines 50-51) or other biopolymer, or other matrices (Column 4, Lines 53-63). Kadiyala et al., further teach said cells to be mesenchymal stem cells (Column 5, Lines 28-29). The glass mold, because it is slitted has openings for perfusion of medium. Said glass molded suture construction is placed in a petri dish and incubated at 37 °C for 15-20 mins to set the gel. Subsequently, the mold in petri dish was flooded with culture medium without serum and the petri dish was re-incubated for 4-6 hours (Column 5, Lines 35-46). This treatment allowed the cells to further contract and the cell containing gel firmed on the sutures. Furthermore, the gel detached from the walls of the mold. The detachment allowed the tension wire to be released and the construct available as an implant (Column 5, Lines 45-50). Kadiyala et al., additionally teach aligning the two sutures to each other with springs placed along suture length at 10 mm apart from each other (Column 6, Lines 28-34). Please note the cells within the construct manifest a mechanical tension because of the wire and are aligned along an axis defined by two spaced structures. Furthermore, the gel matrix (i.e., collagen fiber) is also aligned.

Please note, since Kadiyala et al., also describe how to make said growth guide (example 1), Kadiyala et al., teach the method instantly claimed in Claims 23-25 because said teaching encompasses same steps and components as are described in Claims 23-25.

Kadiyala et al., are silent regarding said device having a sheath of a biosorbable material.

As discussed *supra*, under 35 U.S.C. §102(b) rejection, Shakesheff et al., teach a tissue growth guide for repairing nerve tissue (Page 4, lines 3-4 and 18-23), wherein said guide is comprised of a core material comprising collagen and nurite (Page 2, Lines 3-11; Page 3, Lines 6-17); and said core is enclosed in a glass sheath which is impermeable to biomacromolecules, cells and gases (Page 3, Lines 20-28).

Chen et al., teach silicone rubber tubes prefilled with gel substrates containing collagen, fibronectin and laminin, wherein said materials are art-known to develop and regenerate nerves, especially for cell adhesion, differentiation, proliferation and neuronal outgrowth (Page 1542, Column 1, Lines 8-24; Figure 2).

It would have been *prima facie* obvious to a person of ordinary skill in the art at the time the claimed invention was made and said artisan would have been motivated to combine the teachings from Kadiyala et al., with those of Shakesheff et al., and Chen et al.,; because each of Shakesheff et al., and Chen et al., teach a nerve regenerating device wherein a gel matrix comprising the nerve cells is enclosed in a sheath and Chen et al., further describe said sheath to be made of silicone, i.e., biosorbable material. Some of the limitations presented in the above-cited references are not exactly same as instantly claimed. However, the adjustment of particular conventional working components (e.g., materials having equivalent properties), or equivalent components/ techniques is deemed merely a matter of judicious selection and routine optimization of a result-effective parameter, which is well within the purview of the skilled artisan.

From the teachings of the cited references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

17. Claim 22 is rejected under 35 U.S.C. §103 (a) as obvious over the combined teachings from Kadiyala et al., (US Patent 6, 174,333 B1, See Applicants' IDS filed 09/20/2005) in view of each of Shakesheff et al., (WO 02/47557 A1, See Applicants' IDS filed 09/20/2005) and Chen et al (2000. Peripheral nerve regeneration using silicone rubber chambers filled with collagen, laminin and fibronectin. Biomaterials, Volume 21, pages1541-1547) as applied to Claims 1-21 and further in view of Nyberg et al., (1993. Evaluation of a Hepatocyte-Entrapment Hollow Fiber Bioreactor: A Potential Bioartificial Liver. Biotechnology and Bioengineering, Volume 41, Pages 194-203).

In Claim 22 are recited following additional limitations: Claims 15-18 and 22-25 recite following additional limitations:

- A tissue growth guide comprising
- an inner core comprising a biopolymer matrix having one or more cells;
- an outer sheath surrounding said inner core;
- said inner core is fixed to said outer sheath at a first and a second attachment region so that said cells produce a mechanical tension in said core between said attachment regions; and
- said guide is applicable as a bioreactor for the growth of tissue.

Teachings from Kadiyala et al., Shakesheff et al., and Chen et al., as discussed *supra* delineate the distinguishing features of the instantly claimed growth guide. Kadiyala et al., however, are silent regarding applicability of said growth guide as a bioreactor for the growth of tissue.

Nyberg et al., teach a growth guide comprising an inner core constituted of cells in a hydrogel matrix, wherein said hydrogel matrix is collagen. Said cell containing matrix is suspended in a polysulfone hollow fiber, wherein the hollow fiber has an inlet and outlet (Figure 1) so that the matrix may be per fused with a culture medium and said guide is applicable as a bioreactor for growing a tissue (See the title).

It would have been *prima facie* obvious to a person of ordinary skill in the art at the time the claimed invention was made and said artisan would have been motivated to combine the teachings from Kadiyala et al., with those of Shakesheff et al., Chen etal., and Nyberg et al.,; because each of Shakesheff et al., and Chen et al., teach a nerve regenerating device wherein a gel matrix comprising the nerve cells is enclosed in a sheath; Chen et al., further describe said sheath to be made of silicone, i.e., biosorbable material and Nyberg et al., teach applying said guide as a bioreactor to grow tissue.

From the teachings of the cited references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

18. Claims 26-30 are rejected under 35 U.S.C. §103 (a) as obvious over the combined teachings from Kadiyala et al., (US Patent 6, 174,333 B1, See Applicants' IDS filed 09/20/2005) in view of each of Shakesheff et al., (WO 02/47557 A1, See Applicants' IDS filed 09/20/2005) and Chen et al (2000. Peripheral nerve regeneration using silicone rubber chambers filled with collagen, laminin and fibronectin. Biomaterials, Volume 21, pages1541-1547) as applied to Claims 1-21 and additionally in view of additional teachings from Kadiyala et al., (US Patent 6, 174,333 B1, See Applicants' IDS filed 09/20/2005) in view of each of Shakesheff et al., (WO 02/47557 A1, See Applicants' IDS filed 09/20/2005).

In Claims 26-30 are recited methods to implant said guide into a human/animal body and a method to repair a damaged tissue comprising linking a first and second end of a damaged tissue to said guide, allowing said tissue to regenerate through said guide.

Teachings from Kadiyala et al., Shakesheff et al., and Chen et al., as discussed *supra* delineate the distinguishing features of the instantly claimed growth guide. Kadiyala et al., further teach that said growth guide was implanted in a rabbit model having the neuronal defect and repairs were tested (Column 7, Lines 1-7 and 35-42). Shakesheff et al., further teach that their micro conduits increase neurite extension in Wistar rat dorsal root ganglia (Page 7, Lines 18-19).

It would have been *prima facie* obvious to a person of ordinary skill in the art at the time the claimed invention was made and said artisan would have been motivated to combine the teachings from Kadiyala et al., with those of Shakesheff et al., Chen et al., and additional teachings from Kadiyala et al., with those of Shakesheff et al., because each of Shakesheff et al., and Kadiyala et al., teach a nerve regenerating device wherein a gel matrix comprising the nerve cells is enclosed in a sheath that is implanted in animal models to repair a neuronal damage and Shakesheff et al., further teach that Wistar rat dorsal root ganglia were repaired with nuritre growth.

From the teachings of the cited references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

Conclusion

19. For the aforementioned reasons, no claims are allowed.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Kailash C. Srivastava whose telephone number is (571) 272-0923. The examiner can normally be reached on Monday to Thursday from 7:00 A.M. to 5:30 P.M. (Eastern Standard or Daylight Savings Time).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jon Weber can be reached at (571)-272-0925 Monday through Thursday 7:30 A.M. to 6:00 P.M. The fax phone number for the organization where this application or proceeding is assigned is (571)-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding may be obtained from the Patent Application Information Retrieval (i.e., PAIR) system. Status information for the published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (i.e., EBC) at: (866)-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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